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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/823,625	04/14/2004	Jae-cheol Lee	030681-648	4636

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EXAMINER

BUEKER, RICHARD R

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 11/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/823,625

Applicant(s)

LEE ET AL.

Examiner

Richard Bueker

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 August 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 and 22-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 and 22-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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Claims 8 and 9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claims 8 and 9, the phrase "the casing" lacks proper antecedent basis.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4, 15, 16, 18, 22, 23, 25-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pawlyk (2,704,727) taken in view of Onoe (6,270,839). Pawlyk (Figs. 1 and 2) discloses a solid source vaporizer, comprising a powder source container 4 having a gas inlet 5 and gas outlet 6, a heating unit 3, 29 for heating the container, a temperature sensor 37 and temperature controller (col. 2, lines 35-38), and a carrier gas inlet tube which includes a preheating portion wound on the outer circumference of the container. Pawlyk doesn't explicitly state that a cover is installed in an upper portion of the container. Onoe (Figs. 1 and 4, for example) also discloses a solid source vaporizer container, and he teaches that the container can usefully be constructed by installing a cover in an upper portion of a cylinder 12. It would have been obvious to construct the container of Pawlyk by providing it with a cover because Onoe teaches that a container constructed in that manner can successfully be used as a solid source vaporizer container. It is noted that the claim 1 reference to atomic layer deposition is a recitation of intended use that does not so limit the present apparatus

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claims. Regarding claims 25 and 26, Onoe also teaches that carrier gas inlet tube can successfully be connected as described in these claims. Also, Pawlyk's outlet tube in Fig. 1 is installed horizontally near the upper end of the container as in claim 27.

Regarding the recitation of "wherein a plurality of guide plates formed of a plurality of layers are formed in the container, so as to elongate a gas exhaust path" now added to claim 1, it is noted that Pawlyk (see Fig. 2) teaches the use of layers 13 of powdered precursor material held between screens 15. Each layer of powder held between screens is a plate that guides the carrier gas flow, and thus meets the above quoted limitation. Also, the screens 15, and the screens 16 of Pawlyk, can be described as plates as claimed. Also, the plates of powder (and the screen plates) cause the carrier gas to flow in a gas exhaust path having a zigzag shape as required by claim 22. It is noted also that Onoe in Figs. 1 and 2 illustrates powder precursor held between screens in the form of a plate, and it would have been obvious to form the layers of powder in Pawlyk in the manner illustrated by Onoe in Figs. 1 and 2. It is also noted that Onoe teaches that a vaporizer of the type disclosed by Pawlyk can be improved by providing it with plural plates holding powder as illustrated in Figs 4-9. The plates of Figs. 4-9 of Onoe guide the carrier gas through a gas exhaust path in a zigzag shape as recited in claim 22. It would have been obvious to modify the vaporizer of Pawlyk by providing it with carrier gas guide plates that hold powdered precursor as taught by Onoe. The guide plates that are now recited in claim 1 would have been obvious to one skilled in the art from the teachings of Pawlyk and/or Onoe.

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Claims 3, 4 and 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pawlyk (2,704,727) taken in view of Onoe (6,270,839) for the reasons stated in the rejection of claim 1 above, and taken in further view of applicants' description of the prior art. Regarding the casing recited in claims 3 and 4, it would have been obvious to provide the vaporizer container of Pawlyk and/or Onoe with a heater and a casing of the type illustrated in applicants' Fig. 1 (labeled "prior art") because applicants' description of the prior art (page 2, lines 19-21) teaches that it was known to be desirable to provide a heater for a vaporizer container, and a heater casing for the heater to protect and thermally insulate the heater. Applicants' Fig. 1 also illustrates the use of a thermocouple, valves and a supply hole as in claims 28-30. Also, the prior art vaporizer of applicants' Fig. 1 includes a plurality of guide plates 30 that elongate a gas exhaust path, and it would have been obvious to combine Pawlyk's teachings of a gas inlet tube wound preheating portion with the prior art vaporizer having a casing, a thermocouple, valves, a supply hole, guide plates and an elongated exhaust path as illustrated in applicants' Fig. 1.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pawlyk (2,704,727) taken in view of Onoe (6,270,839) and applicants' description of the prior art for the reasons stated in the rejection of claims 3 and 4 above, and taken in further view of Hillman (5,451,258) or Tsukada (6,319,327). Applicants' description of the prior art states that the purpose of the casing 20 of Fig. 1 is to prevent heat from dissipating. Hillman (see Fig. 1 and col. 5, lines 14-31) and Tsukada (see Fig. 1, elements 64a and 64b and col. 7, lines 4-39) each teaches that heat can be more completely prevented

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from dissipating from a heated chamber by providing a layer of thermal insulation on the inside surface of the heated chamber, and in view this teaching it would have been obvious to provide the heated chamber illustrated in applicants' Fig. 1 with an insulation layer.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pawlyk (2,704,727) taken in view of Onoe (6,270,839) for the reasons stated in the rejection of claim 1 above, and taken in further view of Lei (2003/0053799) and Jurgensen (WO 02/27064). Lei (see Figs. 1 and 2) and Jurgensen (see Fig. 3) both teach the use of a heater inside of a vaporizer container. Jurgensen in particular teaches the use of an internal heater in combination with an external heater. It would have been obvious to one skilled in the art to provide an internal heater for each of the powder holding plates of Onoe because Lei and Jurgensen teach that it is desirable to provide such an internal heater.

Claims 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pawlyk (2,704,727) taken in view of Onoe (6,270,839), Lei (2003/0053799) and Jurgensen (WO 02/27064) for the reasons stated in the rejection of claim 6 above, and taken in further view of Applicants' description of the prior art and Hillman (5,451,258). Regarding the casing recited in claims 7-9, it would have been obvious to provide the vaporizer container of Pawlyk and/or Onoe with a casing of the type illustrated in applicants' Fig. 1 (labeled "prior art") and as illustrated by Hillman (see Fig. 1) because applicants' description of the prior art (see page 2, lines 19-21) and Hillman (see col. 5,

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lines 14-31) teach that it was known to be desirable to provide a thermally insulating casing for a vaporizer container.

Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pawlyk (2,704,727) taken in view of Onoe (6,270,839) for the reasons stated in the rejection of claim 1 above, and taken in further view of Sandhu (2003/0072875). Pawlyk teaches the use of an electric heater 29 to heat the casing 2, but does not discuss the use of a thermoelectric device such as a Peltier device as the heater 29. Sandhu (Fig. 3 and paragraph 28), however, teaches that the heater 108 that heats a solid source vaporizer container can be a Peltier effect heater. Furthermore, Sandhu teaches (paragraph 28) that the Peltier effect heater 108 does not need to be in direct contact with the surface 106, which transmits heat to the solid source. Sandhu teaches that any coupling can be used to transfer energy from heater 108 to surface 106. From these teachings of Sandhu it would have been obvious to one skilled in the art that a conventional prior art heat transfer means such as the heating bath of Pawlyk can be used in combination with the Peltier effect heater suggested by Sandhu. It would have been obvious to substitute the Peltier effect heater suggested by Sandhu for the electric heater of Pawlyk, because Sandhu makes clear that a solid source precursor can successfully be vaporized by employing a Peltier effect heater. Regarding claim 26, Sandhu (see Fig. 26) also teaches that a carrier gas inlet can successfully be connected in a middle portion of a container.

Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pawlyk (2,704,727) taken in view of Onoe (6,270,839) and Sandhu (2003/0072875)

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for the reasons stated in the rejection of claims 10-12 above, taken in further view of Sugioka (4,516,527) (col. 3, lines 46-68), who teaches that the thermal contact between a Peltier heating device and a vaporizer container can be improved by interposing a thermally conductive compound or pad. It would have been obvious to use such a thermal conductivity improvement means with the Peltier effect heater suggested by Sandhu, for the desirable purpose of improving thermal conductivity.

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pawlyk (2,704,727) taken in view of Onoe (6,270,839) for the reasons stated in the rejection of claim 1 above, and in further view of Bailey (5,076,206) (Figs. 4 and 5 and col. 4, lines 22-24 and 52-54) or Jurgensen (WO 02/27064). The winding arrangement of Pawlyk's carrier gas supply tube is considered "serpentine" as recited in claim 16. However, if for argument's sake the term "serpentine" were considered to require a "back and forth" pattern, such would have been obvious in view of Bailey or Jurgensen, who both teach that a gas preheating tube can be in serpentine form. It would have been obvious to wind a carrier gas preheating tube of the type taught by Pawlyk in a serpentine form of the type taught by Bailey or Jurgensen because they teach that a gas can successfully be preheated by using a tube in such a shape.

Claims 17-20 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pawlyk (2,704,727) taken in view of Onoe (6,270,839) for the reasons stated in the rejection of claim 1 above, and taken in further view of Hiai (5,019,423), Visser (5,322,710) and/or Sielaff (4,861,524). Onoe (see col. 4, lines 35-40) teaches that the primary consideration for choosing a material of construction is that the material be inert

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to the powder source material. Also, Hiai (5,019,423) (col. 5, lines 41-44) teaches that a powder source vaporizer container can be made of any material of construction (glass, resin or metal) that is inert to the powder. Also, Visser (the Fig., col. 4, lines 37-39 and col. 6, lines 19-34) teaches that it was known in the art that vaporizer containers could be constructed of quartz because it is a chemically inert material. Also, Sielaff teaches that quartz is an inert substance that is compatible with a CVD precursor source. It would have been prima facie obvious to construct the container of Pawlyk and or Onoe of quartz because quartz was known in the prior art to be an inert material. Regarding the stainless steel recited in claim 20, it is noted that Onoe teaches that his container 1 can be made of stainless steel. Alternatively, Pawlyk teaches the use of container 2 as an external container surrounding internal container 4, and the use of stainless steel for the tank 2 of Pawlyk would have been obvious in view of the well-known corrosion resistant nature of this commonly used metal. Also alternatively, Sielaff (Figs. 1 and 2, col. 2, lines 42-62 and col. 3, lines 25-26) teaches that it was known in the art that vaporizer containers could be constructed of quartz-lined metal. Regarding claim 20, it would have been obvious to use stainless steel as the metal of Sielaff in view of applicants' description of the prior art (page 2, lines 7-8) which makes clear that stainless steel was commonly used for constructing sources. Regarding claim 24, Onoe teaches that the powder holding plates should be made of an inert material. Because quartz was known in the prior art as an inert material, it would have been obvious to form the plates of Onoe from quartz.

Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pawlyk (2,704,727) taken in view of Onoe (6,270,839) for the reasons stated in the rejection of claim 1 above, and taken in further view of Antell (GB 2,223,509) (see Fig. 1, element 6), who teaches that a gas outlet tube can be successfully connected to a vaporizer in a horizontal position, and therefore it would have been prima facie obvious to connect the outlet tube of Pawlyk and/or Onoe in a horizontal position, with an expectation of success.

Claim 30 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 30, which is dependent on claim 1, now claims guide plates in addition to a source supply hole. Applicants' Fig. 5 discloses the use of guide plates 260 in combination with a source supply hole 115, but applicants' specification fails to explain how the fill hole is used when the guide plates are in their operating position as shown in Fig. 5. It is noted that the purpose of the supply hole is to allow replenishment of powder without removing the cover 113, but the guide plates would prevent the use of the supply hole.

Applicants have amended claim 1 to include the limitations of claim 21, which was rejection over the teachings of Lei (2003/0053799). Applicants have argued that the vaporizer of Lei is not a "powder source" vaporizer because Lei teaches that the solid CVD precursor compound is applied to Lei's surfaces 6 by pressing or by dipping

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in a liquid solution followed by drying (see paragraphs 28 and 29 of Lei). In view of this argument, the Lei reference has been replaced by Onoe as described in the rejections above. Onoe teaches the limitation added to claim 1 of "wherein a plurality of guide plates formed of a plurality of layers are formed in the container, so as to elongate a gas exhaust path", and Onoe also teaches the use of a "powder source" material.

Applicants have also argued that "the guide plates recited in claim 1 are designed to assist in the removal of powdered source material from the carrier gas". It is noted, however, that claim 1 recites that the function of the guide plates is "to elongate a gas exhaust path". Onoe's guide plates also perform this function.

The prior art made of record and not relied upon is considered pertinent to applicants' disclosure. Shero (2005/0072357) is cited of interest for his teachings of a powder source vaporizer that includes guide plates in a manner analogous to Onoe.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard Bueker whose telephone number is (571) 272-1431. The examiner can normally be reached on 9 AM - 5:30 PM, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parvis Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Richard Bueker

Richard Bueker
Primary Examiner
Art Unit 1763